

## CLAIMS

- 1 1. An apparatus comprising:  
2 at least one processor;  
3 a memory coupled to the at least one processor; and  
4 an optimizer residing in the memory and executed by the at least one processor,  
5 the optimizer analyzing an expression and generating from the expression a graph that  
6 includes at least one node, the optimizer generating from the graph an execution plan for  
7 the expression, the execution plan comprising a plurality of execution plans that  
8 correspond to different portions of the graph.
- 1 2. The apparatus of claim 1 wherein the plurality of execution plans are appended to  
2 corresponding nodes in the graph.
- 1 3. The apparatus of claim 1 wherein the optimizer generates a new execution plan  
2 for the query by changing at least one of the plurality of execution plans, and by using an  
3 existing execution plan for each portion of the graph that is unaffected by the change.
- 1 4. The apparatus of claim 1 wherein the graph further comprises a plurality of  
2 relations and a plurality of expressions.

1 5. An apparatus comprising:  
2 at least one processor;  
3 a memory coupled to the at least one processor;  
4 a database residing in the memory;  
5 a database query optimizer residing in the memory and executed by the at least  
6 one processor, the database query optimizer processing a query to the database, the  
7 database query optimizer comprising:  
8 a graph builder that generates from the query a graph that includes at least  
9 one node; and  
10 an execution plan generator that generates from the graph an execution  
11 plan for the query, the execution plan comprising a plurality of execution plans  
12 that correspond to different portions of the graph.

1 6. The apparatus of claim 5 wherein the execution plan generator appends the  
2 plurality of execution plans to corresponding nodes in the graph.

1 7. The apparatus of claim 5 wherein the execution plan generator generates a new  
2 execution plan for the query by changing at least one of the plurality of execution plans,  
3 and by using an existing execution plan for each portion of the graph that is unaffected by  
4 the change.

1 8. The apparatus of claim 5 wherein the graph further comprises a plurality of  
2 relations and a plurality of expressions in the query.

1 9. The apparatus of claim 5 wherein the optimizer compares a plurality of execution  
2 plans that each functionally represent the query to estimate which of the plurality of  
3 execution plans will be executed in the least amount of time.

1 10. A method for evaluating an expression comprising the steps of:  
2 reading the expression;  
3 generating from the expression a graph that includes at least one node;  
4 generating from the graph an execution plan for the expression, the execution plan  
5 comprising a plurality of execution plans that correspond to different portions of the  
6 graph.

1 11. The method of claim 10 further comprising the step of appending the plurality of  
2 execution plans to corresponding nodes in the graph.

1 12. The method of claim 10 further comprising the step of generating a new execution  
2 plan for the query by performing the steps of:  
3 changing at least one of the plurality of execution plans; and  
4 using an existing execution plan for each portion of the graph that is unaffected by  
5 the change.

1 13. The method of claim 10 further comprising the step of comparing a plurality of  
2 execution plans that each functionally represent the query to determine which of the  
3 plurality of execution plans will likely be executed in the least amount of time.

1 14. A program product comprising:  
 2 (A) an optimizer that analyzes an expression and generates from the expression a  
 3 graph that includes at least one node, the optimizer generating from the graph an  
 4 execution plan for the expression, the execution plan comprising a plurality of execution  
 5 plans that correspond to different portions of the graph; and  
 6 (B) computer-readable signal bearing media bearing the optimizer.

1 15. The program product of claim 14 wherein the computer-readable signal bearing  
 2 media comprises recordable media.

1 16. The program product of claim 14 wherein the computer-readable signal bearing  
 2 media comprises transmission media.

1 17. The program product of claim 14 wherein the optimizer appends the plurality of  
 2 execution plans to corresponding nodes in the graph.

1 18. The program product of claim 14 wherein the optimizer generates a new  
 2 execution plan for the query by changing at least one of the plurality of execution plans,  
 3 and by using an existing execution plan for each portion of the graph that is unaffected by  
 4 the change.

1 19. The program product of claim 14 wherein the graph further comprises a plurality  
 2 of relations and a plurality of expressions.

- 1 20. The program product of claim 14 wherein the optimizer compares a plurality of
- 2 execution plans that each functionally represent the expression to estimate which of the
- 3 plurality of execution plans will be executed in the least amount of time.

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